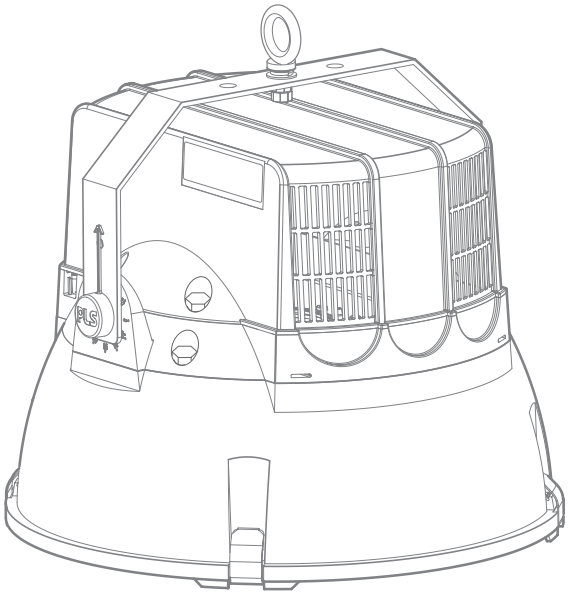
PLS (Plasma Lighting System)

SERVICE MANUAL

Caution: Please read the “**Safety precaution**” before repairing the product.

Model: PSH0731B



Contents

1. Safety precaution

Caution: PLS product operates at high temperature and generates high voltage at the power supply. Because it can cause serious injury such as electric shock or burn when handling the product, please read follow the check order as shown below.

1. Installation and repair/check precaution
   - Never disassemble the product unless done by specialized service technician. (It can cause safety accidents such as electric shock or fire.)
   - When servicing the product, unplug the power cord and make sure that the power is completely disconnected.
   - When repairing or checking the PLS product immediately after operating the product, wait until the system is cooled sufficiently.
   - If PLS is abnormally turned off, always handle the product after disconnecting the power. (It can cause electric shock or leakage of electromagnetic wave.)
   - If the product is wet, always wipe out the moisture before working on the product.
   - Clean the front cover glass periodically to maintain the illumination.
   - Do not directly look into the bulb while the product is operating. The strong light can cause visual defect to the eye.

2. Check grounding
   - Before working on the product, check whether the product is grounded and make sure to ground the product if not done so.

3. Electricity connection test for troubleshooting
   - Install the repair jib on flat floor and mount the PLS product, and then connect the power.
   - Do not leave any flammable material around the product and keep a safe distance as defective parts can heat up to start a fire.
   - Because the heat can be concentrated on the illuminated area, keep more than 30cm of distance from flammable material or from the floor.

4. Check and replacement method for electric parts
   - When checking the electric part immediately after disconnecting the power, discharge the high voltage part of the PCB before doing so. (High voltage capacitor and lightron high voltage charge can cause electric shock.)
   - When the electricity is connected, never touch the power circuit. (High voltage of DC 3500V~4000V is generated on the high voltage part.)
   - Do not use parts that do not comply with the specification. (It can cause an error.)
   - When there is an issue with the power circuit, it is difficult to replace the individual parts installed on the PCB. Therefore replace the entire power supply.
     ※ Caution: When using devices such as tester to check for error, always disconnect the electricity before using.

5. Electricity/Operation test after repair
   - Never operate the product when it is not fully assembled such as lightron disassembled and waveguide separated etc. It can cause strong leakage of electromagnetic wave.
   - Connect the electricity in normal condition after sufficiently checking the electric/mechanical assembly of parts, wiring condition and grounding connection etc.

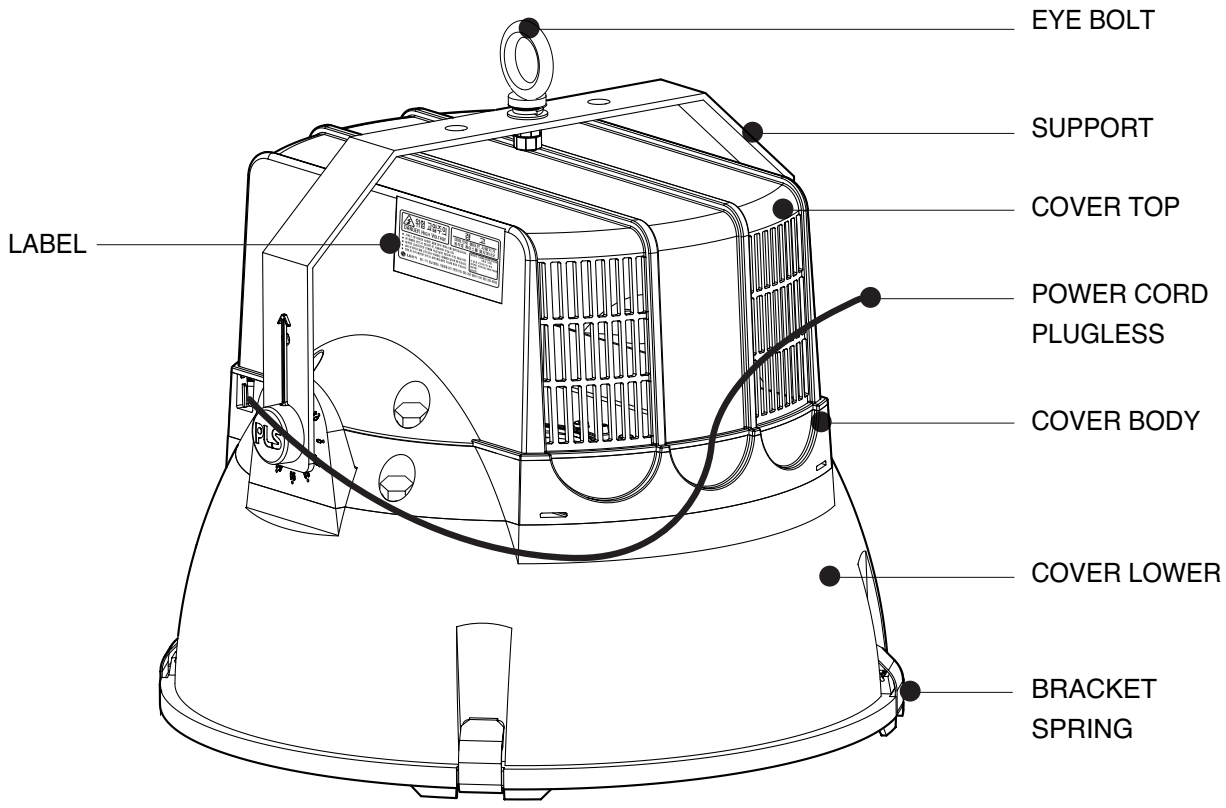
6. Correct installation and grounding check
   - After repairing the PLS product, clean the exterior and interior of the main unit and check the grounding condition. And then install the product in its original position.

2. Product specification

No.	CLASSIFICATION		SPECIFICATION
1	Rated voltage (AC)		Single phase 220-240 V / 50 Hz
2	Rated current (AC)		3.5 A
3	Power consumption		730 W
4	High frequency output (Microwave)		550 W
5	High frequency		2450 ± 50 MHz
6	Magnetron		2M214 – 03RIS7
7	Optical speed		58,500 lm
8	Optical efficiency		80 lm/W
9	Color temperature		4,500K, 6,500K, 7,500K
10	Color rendering index		80 Ra
11	Dimension (L x W x H)		500 mm × 500 mm × 490 mm
12	Weight (kg)		18.2 kg
13	Safety device	Fuse	Block overcurrent above specification: 250 V, 10 A
		Thermostat	Prevent overheating of LTN: 130 ˚C / 70 ˚C
		Abnormal voltage detection	Over: 264V or above Under: Block system when 176V or below
		Thermistor	Prevent overheating of power supply module: 75 ˚C
		Input current check	Detect oscillation of lightron
14	Characteristics		Lighting speed of 30 seconds

※ Above specification and safety circuit may change without separate notification.

3. Exterior and name



4. Installation environment and method

▣ PSH0731B installation environment guide

[● : Can be installed, ▲ : Request for consultation, × : Cannot be installed]

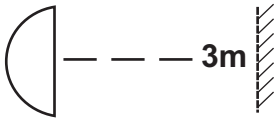
Installation environment		PSH0731B
Application classification	Temperature range of use (˚C)	-20 ~ +40 ˚C
	Humidity range of use (%)	80% or less
	Indoor installation (Fixed downward)	×
	Plant	●
	Indoor gym	●
	Warehouse	●
	High rise building (Indoor)	●
	Large building (Indoor)	●
	Square or play field	●
	Park	●
	Large bulletin board	●
	Large wall	●
	Bridge	●
	Environment with high temperature and humidity	▲
	Environment with use of gas	×
	Area with vibration	▲
	Area with metallic dust	▲
	Operating time of 24 hours/day	▲
	Operating time of 16 hours/day	●
	Operating time of 10 hours/day	●
	Operating time less than 10 hours/day	●
	Area difficult for A/S	▲
	Wireless LAN	●
Power supply	Input power condition	Single phase 220V ± 15%
	Power wiring (mm^2/unit)	2.0 mm^2 or above
	Wiring per switch	3 or less
	Circuit breaker capacity (Per unit)	10A or above
	Main wiring (mm^2)	–
	- When wiring 2 units	3.5 mm^2 or above
	- When wiring 4 units	5.5 mm^2 or above
	- When wiring 6 units	8.0 mm^2 or above
	- When wiring more than 6 units	Request for consultation

※ To maintain safety of high voltage power and to prevent malfunction, connecting the grounding cable to each PLS set.

※ Above conditions related to power must be complied. If changes are required, please contact LG for consultation.

▣ Installation method and example

1) This product (PSH0731B) is developed for indoor use and can only be used indoors.
2) To prevent the product from falling by wind or external force, use bolt and nut of M12 or higher.
3) This product has been developed to face downward. Install and use the product facing down.
4) Make sure that objects do not interfere with the cooling of the product and make sure that the inlet/outlet is not sealed.
5) When installing in a location where the environment exceeds the applicable temperature and humidity, consult with the service center since it can cause unexpected problems.
6) Consult the service center when installing in a location where chemical material, such as TCE system or chloride gas or where vibration is very strong since it can cause unexpected problems affecting the life span of the product.
7) When using in a location where dust is very heavy, it can cause the illumination reduction from the dust. It requires periodical cleaning and cannot be installed in a location where metallic dust is heavy.
8) The mark means min. distance from PLS to lighted object when install the PLS, check the distance from PLS on the optical axis of PLS.



CAUTION

1. Follow regulations of government agency for technical standard and electric power company's guide regarding regulations on equipment and wiring.

⚠ WARNING

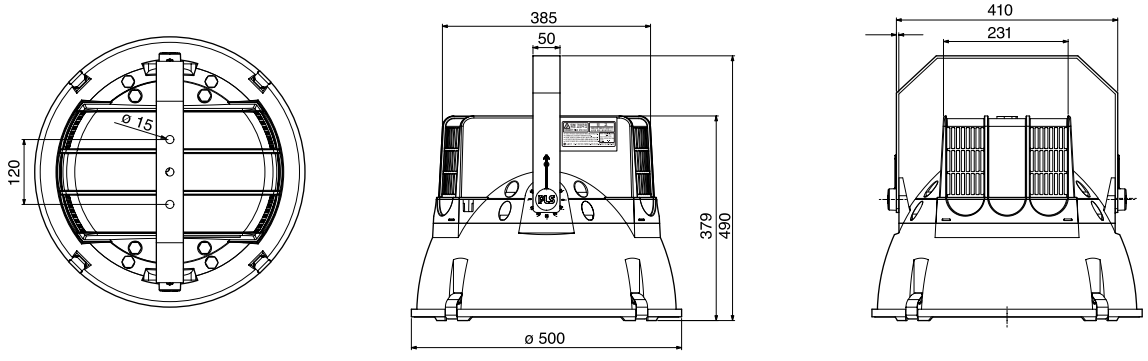
- By the regulation and this installation guide, electric work using a specific circuit must be done by certified electric technician. It can cause fire or electric shock if capacity of power supply circuit is insufficient or faulty.

2. Do stated earth work when installing PLS

⚠ WARNING

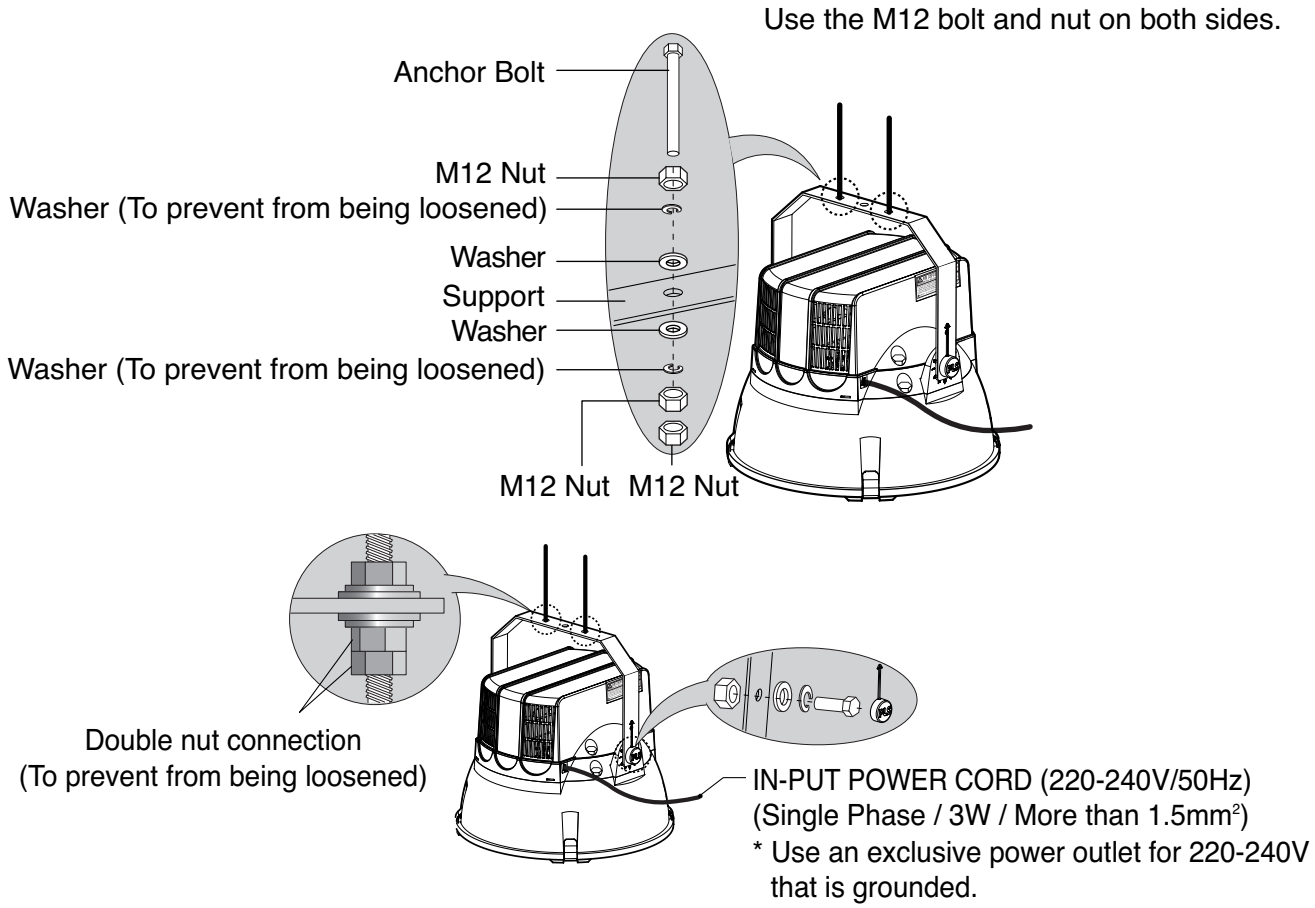
- Do earthwork of PLS. Do not connect earth wire with gas pipe, water pipe, lightning rod or telephone line. It can cause electric shock as it makes earthwork incomplete.

※ Product size



(Units : mm)

※ Installation standard (For fixed type on ceiling)



* PLS is not equipped with a terminal block. For installation, please get professional assistance.
  - Terminal Block Specification
    (a) Rated Voltage: 250V or above
    (b) Rated Power: 10A or above
    (c) 3 way bolt fastening type
  - After connecting power line to the terminal block, ensure that the power line makes secure contact with fastening bolt or clamp and the power line is securely fastened.

⚠ WARNING

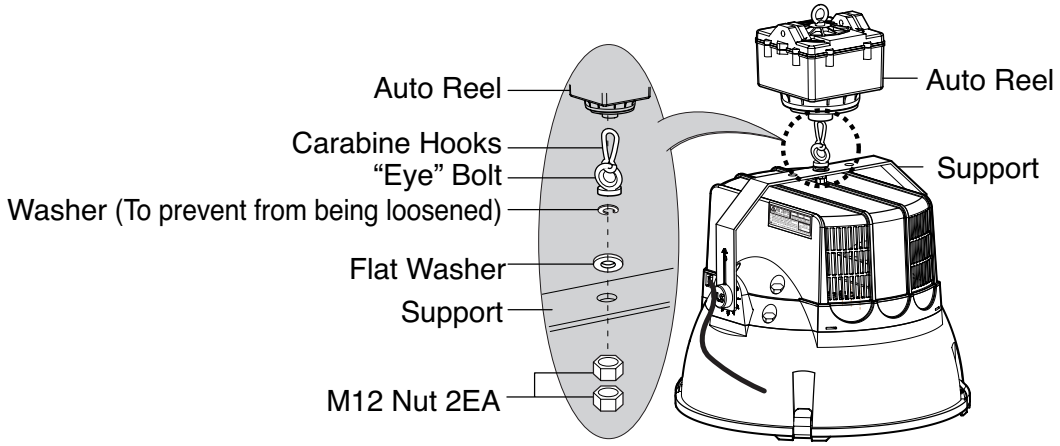
- After wiring power line to terminal box, check if the line touches tightening bolt or clamp or is being forced.
- Use regulated electric wire so connecting part of terminal is knocked out by external force. It can cause fire if connecting part is fixed tightly as it generates heat.
- Wire power line after ring terminal work. It can cause fire and failure of electric parts.
- Check Neutral status when installing main power
- Ending part of PLS has to be waterproof when connecting it to terminal.

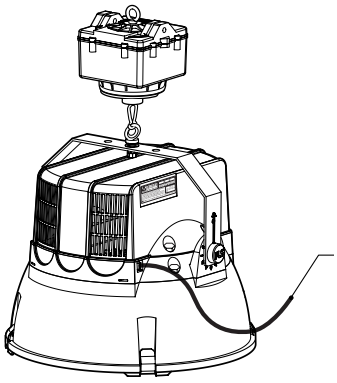
* Caution: When installing the product, you must exchange and use new washers to prevent them from being loosened. When installing the anchor bolt, you must work the qualified technicians, for two men or more, and should be not cut the power cord.

* For the parts required for this installation case, only the basic spec parts are provided.

※ Installation standard (When using lighting reel)

Connect bolt and nut to central hole.





IN-PUT POWER CORD (220-240V/50Hz)
(Single Phase / 3W / More than 1.5mm^2)

* Use an exclusive power outlet for 220-240V that is grounded.

* PLS is not equipped with a terminal block. For installation, please get professional assistance.
  - Terminal Block Specification
    (a) Rated Voltage: 250V or above
    (b) Rated Power: 10A or above
    (c) 3 way bolt fastening type
  - After connecting power line to the terminal block, ensure that the power line makes secure contact with fastening bolt or clamp and the power line is securely fastened.

* Caution: When installing the product, you must exchange and use new washers to prevent them from being loosened. When installing the anchor bolt, you must work the qualified technicians, for two men or more, and should be not cut the power cord.

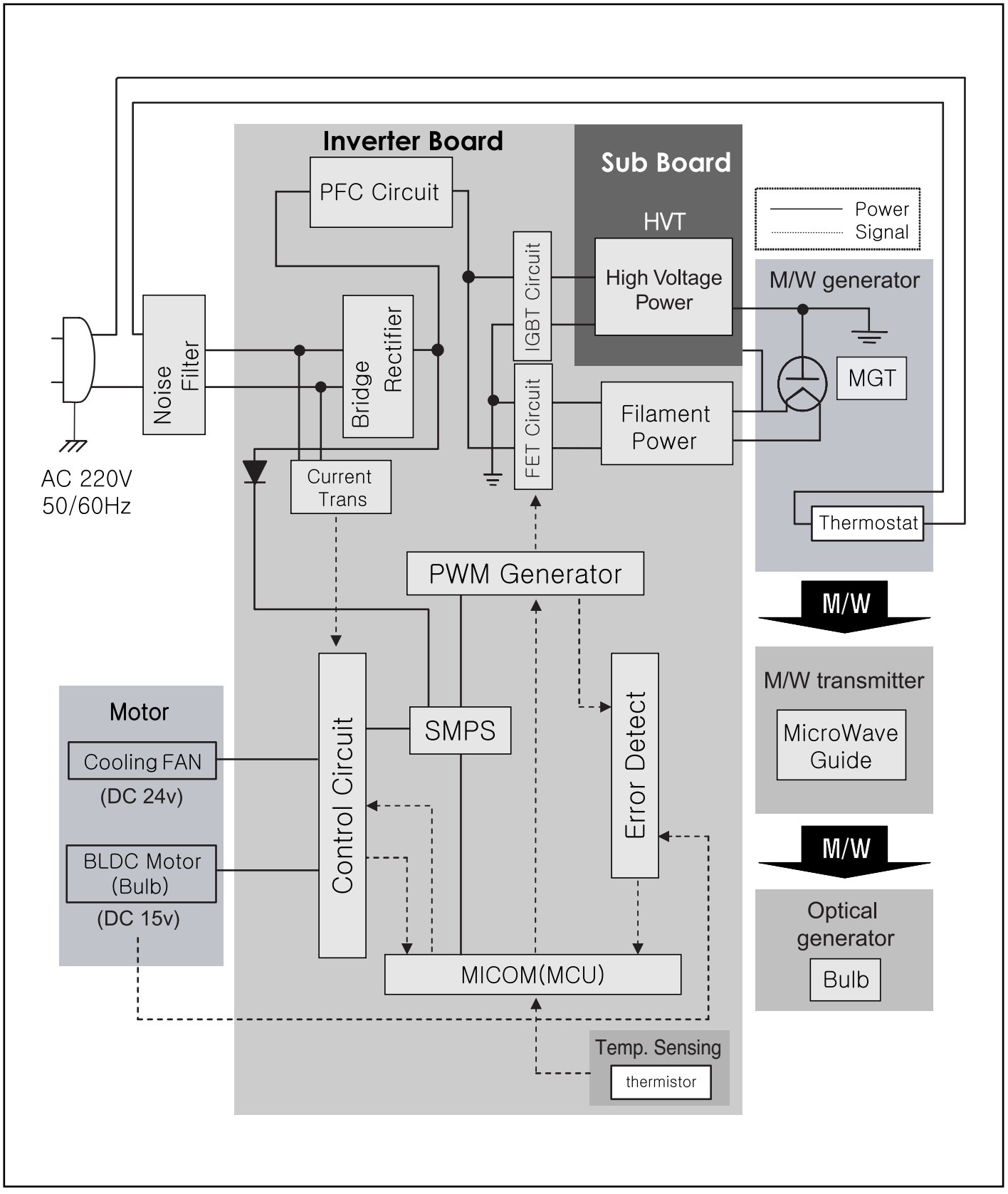
▣ Example of incorrect installation

※ Below shows the example of incorrect application/usage. Be careful with installation and usage in the following cases as it can cause electric shock, injury, burn etc.

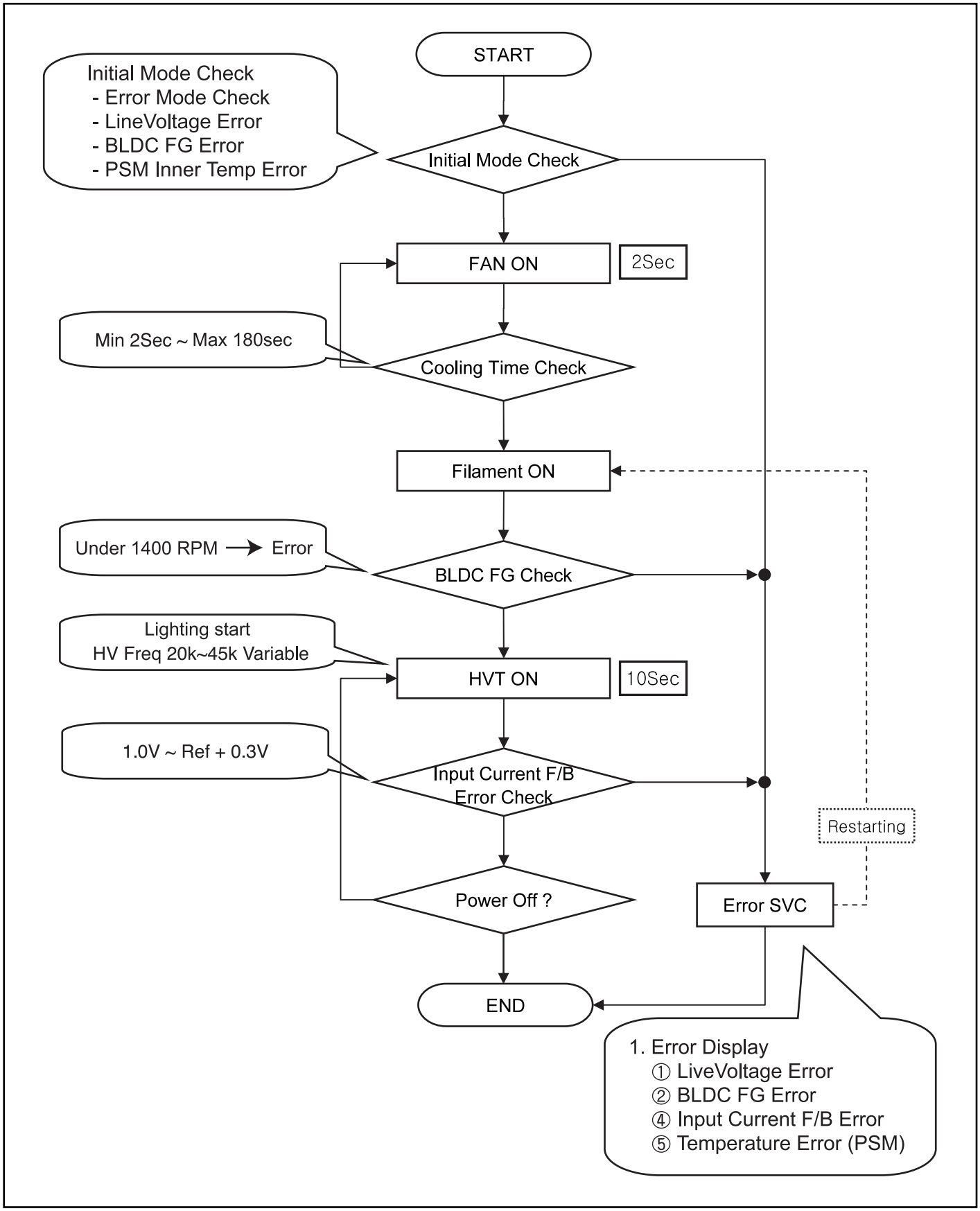
No.	Example of incorrect application and usage	Expected risk
1	When using with impact, such as product falling, applied on product	Fire/Electric shock
2	When using with switchboard below rated current capacity	Fire/Electric shock
3	When product is disassembled and reconfigured arbitrarily	Fire/Electric shock
4	When installing/using product without securing space to cool the product	Fire
5	When fixed/used loosely without considering the installation board, product weight/vibration etc.	Injury
6	When installing, repairing and checking the product in an environment where water can penetrate into the product. This product can be used for underwater lighting (Underwater scenery, exploration, event usage etc.)	Electric shock
7	When using the PLS product without repairing after submersed under water	Fire/Electric shock
8	When using the product in condition with excessive power voltage variance (Above ±15%)	Fire/Electric shock
9	When using the product without grounding	Electric shock
10	When excessively bend the power cord or using damaged power cord	Fire/Electric shock
11	When inserting any pin, coin or metal wire into the internal/external hole on the case	Fire/Electric shock
12	When putting a cover on the exterior of the product for use without considering the suction inlet/exhaust outlet	Fire
13	When using the product with flammable material around the product	Fire/Electric shock
14	When disassembling while the product is operating	Fire/Electric shock
15	When repairing or disassembling the product by an unqualified technician	Fire/Electric shock
16	When using in environment where alien particles penetrate into the suction inlet/exhaust outlet	Fire
17	When cleaning or repairing the product while operating the product	Electric shock
18	When using the product for purpose other than lighting (Heating food, drying clothe, heating etc.)	Fire/Electric shock
19	When moving the product by holding the part other than the main unit (Moving by holding the reflector etc.)	Injury
20	When moving the part without caution not considering the weight of the product	Injury
21	When not wearing any safety gear when contacting the hot part (Cover glass, reflector etc.)	Injury
22	When using the product near a heating device	Fire/Explosion
23	When installing and using the product near areas with risk of flooding	Electric shock
24	When cutting and using the power cord arbitrarily	Fire/Electric shock
25	Humid or water splashing when the installation and use	Fire/Electric shock
26	When making body contact on the product when it is hot while operating or immediately after operating	Injury
27	When installing and using the product in areas not properly ventilated	Fire
28	When using underwater	Electric shock

5. Operating principle and description

▣ Block Diagram

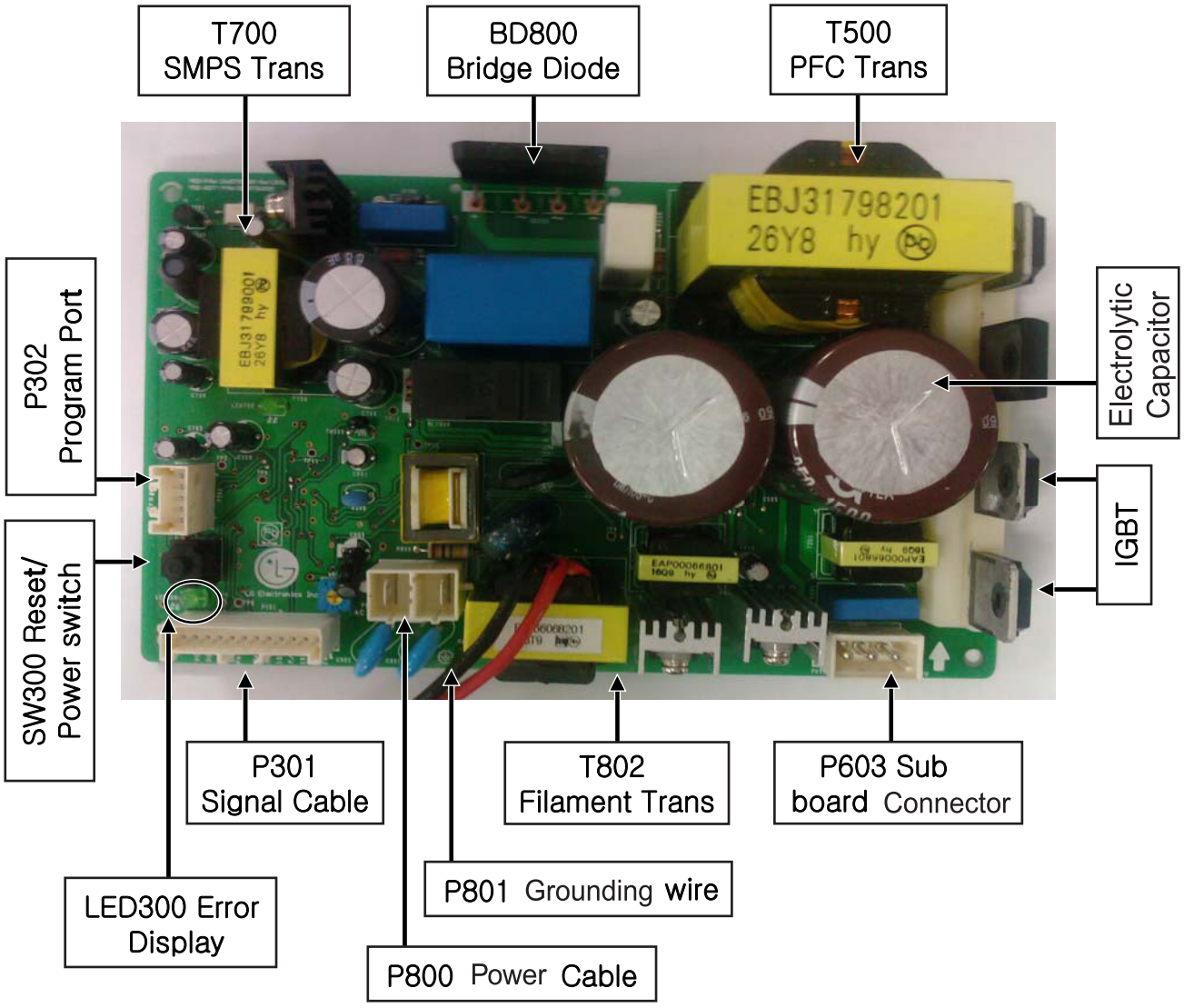


▣ PLS operating order



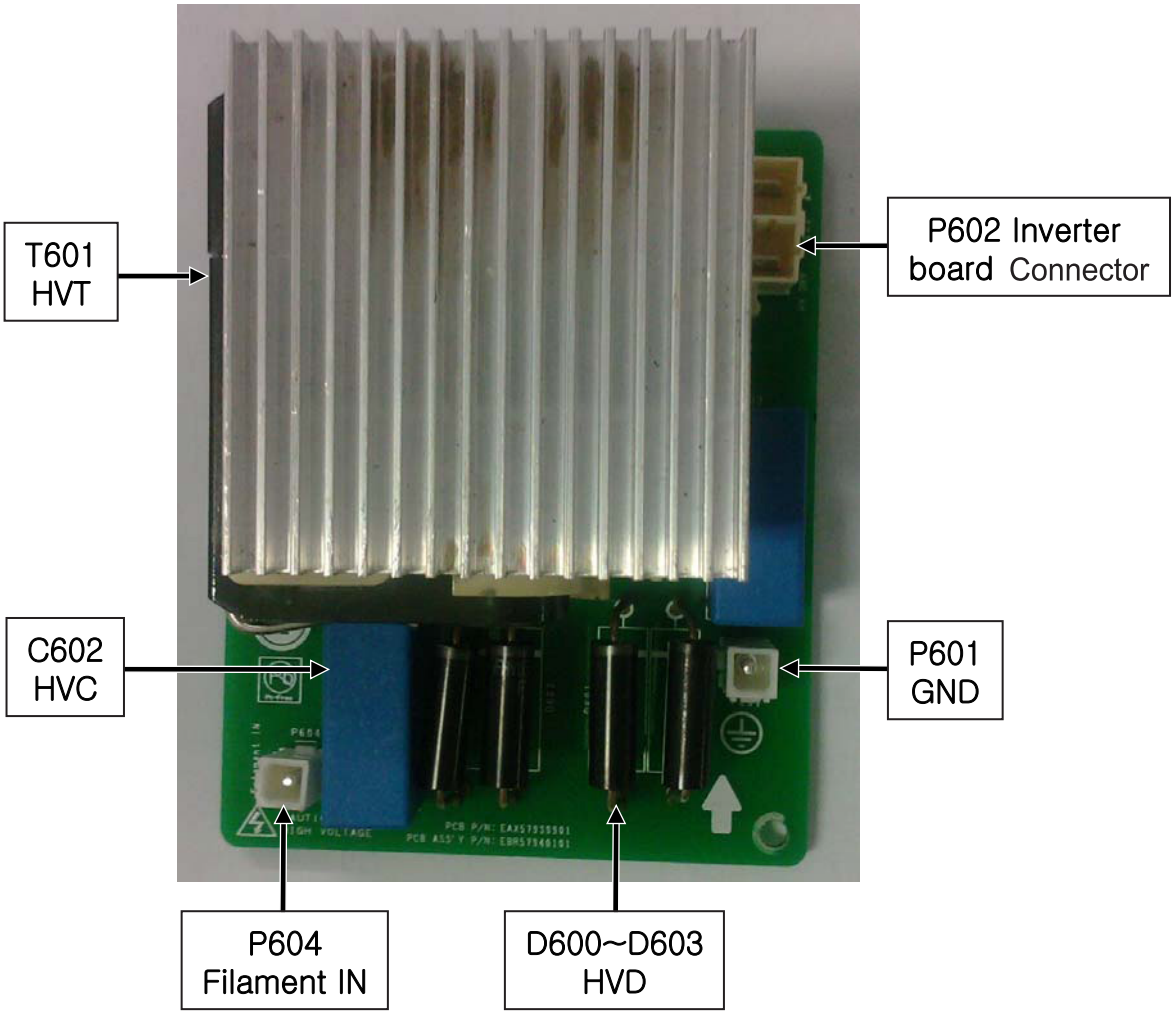
▣ Drive PCB diagram

※ PSH0731B PCB ASSEMBLY INVERTER



▣ Drive PCB diagram

※ PSH0731B SUB BOARD



6. Troubleshooting

▣ Error mode and action

*** Caution: First, check whether the power cord is unplugged from the outlet and then check/repair according to the safety precaution and procedure.**

Error mode	Check point	Check method	Action item 1	Action item 2 (If not resolved by action item 1)
Does not light up initially	Check whether the power cord and other internal wiring is done correctly	Check for any issue on L, N, GND and internal wiring	Check wiring based on installation standard and internal wiring	
	Check whether the fuse is disconnected	Separate the noise filter box of the power supply and visually check whether the fuse is disconnected	Replace PSM (Power Supply Module)	
	Check error check mode: Flash error LED 1 time	Check the input power voltage		
	Check error check mode: Flash error LED 2 times	Check whether BLDC rotates	Replace bulb assembly	
		Check BLDC cable wiring	Connect the cable	
	Check system power consumption	After checking the power consumption using the measuring device, check whether it is normal	If normal, replace the bulb assembly	Replace generator assembly
Lamp goes off trying to turn on	Check whether DC fan of LDM part is operating normally	Check system DC fan cable	Connect the cable	Replace DC fan
	Check error check mode: Flash error LED 5 times	Check whether PSM cooling fan is operating and whether there is any issue with wiring	Connect the cable	Replace DC fan
	Check error check mode: Flash error LED 1 time	Check input power voltage		
	Check resonator condition	Check if the resonator is crushed or have any holes	Replace LDM (Light Drive Module)	
Lamp is dark	Check system power consumption	Check the system power consumption using the measuring device	Replace PSM	Replace generator module

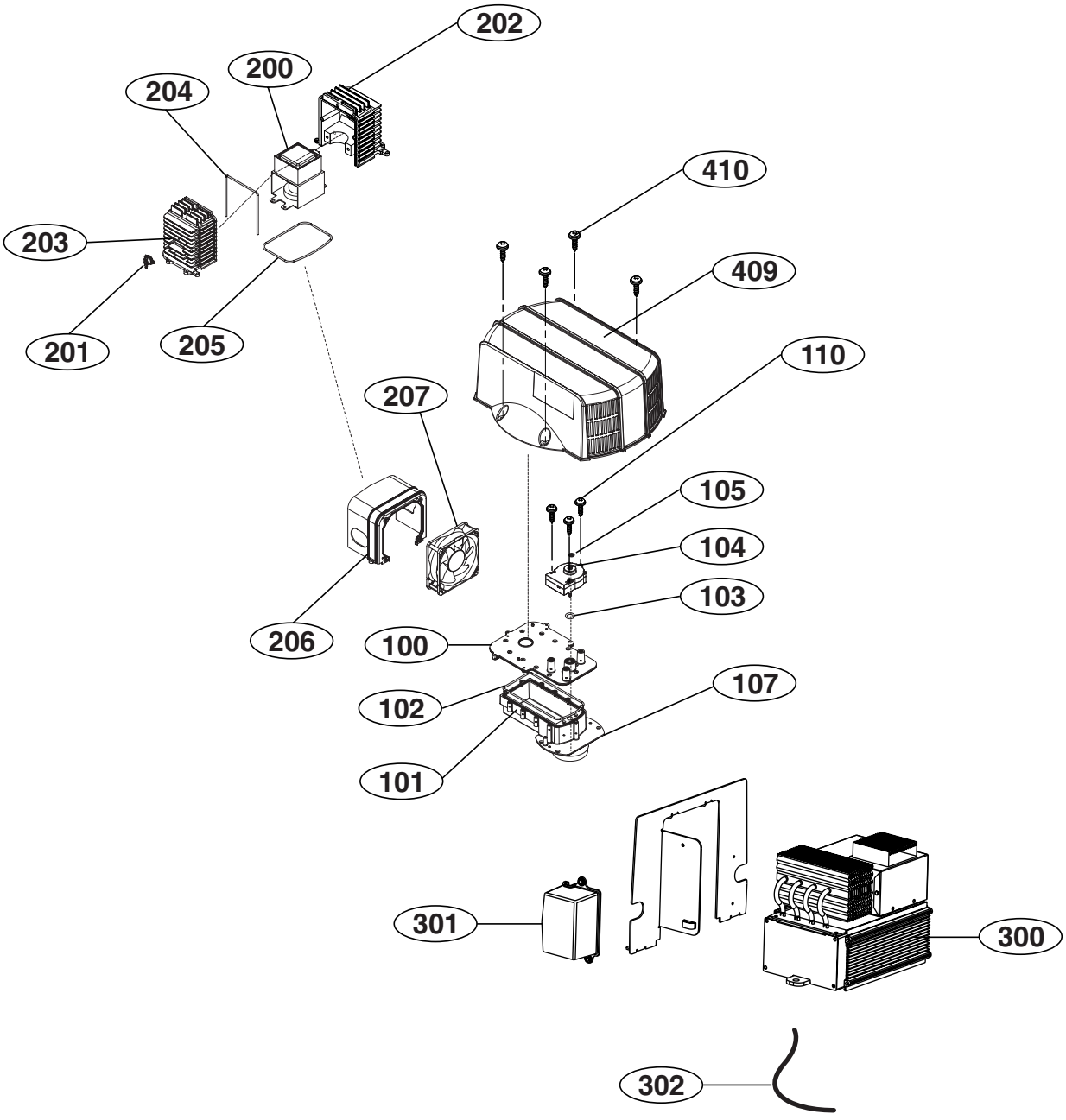
▣ Error check mode and resolution

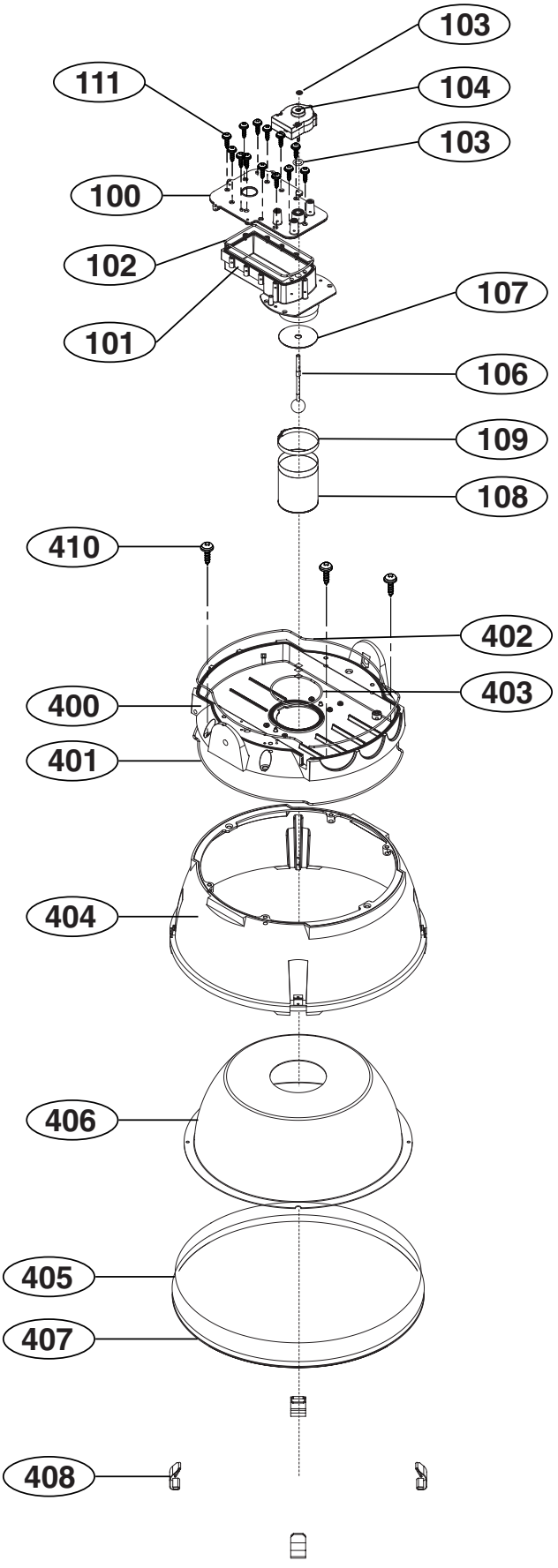
Error Code	Error display	Error detail (Check limit)	Check point
1	Error LED on-and-off 1 time (● ● ●→)	Line Voltage Error Check (220V ± 15% or more)	Unstable input power voltage and operation with overvoltage
2	Error LED on-and-off 2 times (●● ●● ●●→)	BLDC FG Error Check (Less Than BLDC 1,400 RPM)	Check whether BLDC is locked and whether BLDC cable is connected
4	Error LED on-and-off 4 times (●●●● ●●●●→)	Input Current Error Check (Unstable lightron oscillation)	Check whether the lightron is operating normally and whether the system fan is operating
5	Error LED on-and-off 5 times (●●●●● ●●●●●→)	P/Supply Inne Temperature Error Check	Check whether cooling fan is operating

▣ Error cancelation method

Control PCB error Cancel error using clear switch	1. Turn on power line 2. Check error LED 3. Press the error clear switch for 2 seconds. (Wait until the flashing LED is turned off) 4. Wait 30 seconds after the power line is turned off. (Discharge fully) 5. Check for relighting
Cancel error using power line	1. Turn on power line 2. Turn off power line between 3~5 seconds 3. Repeat 1~2 process 5 times. 4. Wait 30 seconds after the power line is turned off on the last 5th time. (Discharge fully) 5. Check for relighting

7. Disassembly diagram

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8. Replacement Parts List

LOC NO.	PART NO.	DESCRIPTION	SPECIFICATION	EA	No.
-	3019300001A	Generator Assembly, Optic	IRIS700_OPTIC_ASSEMBLY	EA	1
100	3064300001A	Wave Guide, Lower	150(L)X70(W)X43(H)	-	-
101	3064300002A	Wave Guide, Upper	150(L)X70(W)X3(H)	-	-
102	5040300010A	Rubber, Conductive	EMI_SHIELD_WAVE GUIDE LO_UP JOINT_3.2*494	-	-
103	5040300011A	Rubber, Conductive	EMI_SHIELD_WAVE GUIDE_MOTOR JOINT_3.4*16	-	-
104	4681300004A	Motor Assembly, Bulb	BLDC Motor, 15V, 2600RPM, WITHIN PCB	-	-
105	3850300003A	Label, Logo	Dust-proof Label, motor D24MM	-	-
106	3525300005B	Bulb Assembly, Main	IRIS 700, CCT:6000-7000	-	-
107	5018Z-L001A	Mirror	OD76, QUARTZ/TA2O3/SIO2	-	-
108	3546300001A	Mesh, Cavity	77.2(W)X98.1(H)X0.3T	EA	1
109	4016Z-M001A	Fastener, Mesh	SUS, OETCK(DEUCH)	EA	1
110	4011300012A	BOLT ASSEMBLY	MOTOR WG ASM	-	-
111	1BHC0401224	BOLT,HEXAGON HEAD,H COARSE 3	D4.0 12MM MSWR3/FNM (Wave Guide Joint)	-	-
-	3019300002A	Generator Assembly, Microwave	IRIS700_GENERATOR ASSEMBLY	EA	1
200	5033300001A	MGT Assembly	IRIS700 2M214-03RIS7 570-630W 3.9-4.1V 11.5-13.5A 2455-2465Hz	-	-
201	4920300003A	Heat Sink	103(L)X73(W)X122(H)_RIGHT_AL DIE_CASTING	-	-
202	4920300004A	Heat Sink	103(L)X74(W)X122(H)_LEFT_AL DIE CASTING	-	-
203	6930Z-0001B	Thermostat	130 Degree, 60Hz	-	-
204	5040300008A	Rubber, Conductive	EMI_SHIELD_HEAT_SINK_R_L_3.4*325	-	-
205	5040300009A	Rubber, Conductive	EMI_SHIELD_HEATINK_WAVE_GUIDE_3.4*426	-	-
206	5238300001A	Air Guide	101(L)X147(W)X120(H)_AL DIE CASTING	-	-
207	5900300001A	Fan, DC	120*120*38 DC 24V 2900RPM	EA	1
-	-	Power Supply ASM	Neo IRIS700, Plugless	EA	1
300	EAY60910901	Power Supply ASM, Inverter	Neo IRIS700	-	-
301	EAM38793002	Filter ASM	Neo IRIS700	-	-
-	-	Case & Light Guide Assembly	-	EA	1
400	3550300008A	Cover, Body	418[L] 400[W] 44[H]	-	-
401	5040300012A	Rubber, Conductive	EMI SHIELD COVER BODY_UPPER_3.4*1080	-	-
402	5040300013A	Rubber, Conductive	EMI SHIELD COVER BODY_LOWER 3.4*1281	-	-
403	5040300014A	Rubber, Conductive	EMI SHIELD OPTIC_COVER BODY JOINT 3.4*312	-	-
404	3550300006A	Cover, Lower	500[L] 500[W] 170[H]	-	-
405	5040300015A	Rubber, Conductive	EMI SHIELD GLASS 6.2*1530	-	-
406	3035300003A	Reflector Assembly	444(D)X158(H) 60(ANGLE)_IRIS700	-	-
407	4890300002A	Glass, Reflector	490(D)X3.2(T)	-	-
408	4810300002A	Bracket, Spring	47(L)X27(W)X21(H) COVER,LOWER_GLASS JOINT	-	-
409	3550300007A	Cover, Top	414[L] 340[W] 155[H]	-	-
410	4011300009A	BOLT ASSEMBLY	COVER LOWER + UPPER ASM	-	-
411	MGJ62022001	Plate, Inner	Press AL	-	-

※ Service inquiry and contact
Tel : 1544-5472
Fax: 055-268-4585
Address : PLS Part
76, Seongsan-dong,
Changwon-city, Gyeongnam, Korea

P/No. : MFL63140803

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